SEI WEBINAR:

A Jumpstart Method for Business Goals and Project Objectives Supporting CMMI High Maturity

21 August 2008

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Software Engineering Institute | Carnegie Mellon

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
21 AUG 2008		**00-00-2008 to 00-00-2008**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
A Jumpstart Method for Business Goals and Project Objectives Supporting CMMI High Maturity	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Carnegie Mellon University ,Software Engineering Institute (SEI),Pittsburgh,PA,15213**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**55**	

Introduction

Robert W. Stoddard currently serves as a Senior Member of the Technical Staff at the Software Engineering Institute. Robert architected and designed several leading measurement and CMMI High Maturity courses including: “Understanding CMMI High Maturity Practices”, “Improving Process Performance using Six Sigma”, and “Designing Products and Processes using Six Sigma”. Robert earned a BS in Business, an MS in Systems Management and is a certified Motorola Six Sigma Master Black Belt. Robert also serves as the Vice Chair of Technology for the ASQ Software Division Council and as an elected member of the IEEE Reliability Engineering Society Adcom.

Agenda

Why This Webinar?

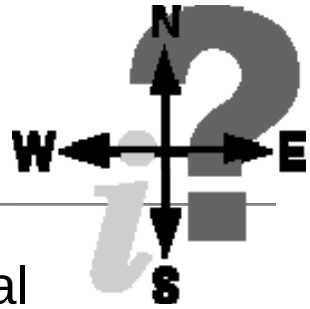
CMMI High Maturity Use of "Business Goals" and "Project Objectives"

Critical Role of Senior Organizational and Project Leaders

The Overall Process to Reach the Goals and Objectives

- Step 1: Developing Vision Statements
- Step 2: Identifying Barriers to the Vision Statements
- Step 3: Formulating Business Goals
- Step 4: Introducing the Goal Decomposition Matrix including the Formulation of Project Objectives
- Step 5: Goals and Objectives Drive Process Performance Baselines and Models

Why This Webinar?



Client coaching and SCAMPI audit results have shown a general misunderstanding of Business Goals and Project Objectives

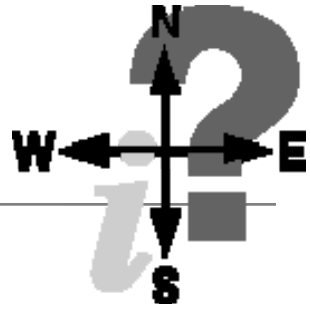
Many organizations are not driving High Maturity Practices, especially process performance baselines and models, to meet business goals and project objectives

Many organizations identify goals and objectives that are vague and in-actionable

Many organizations literally copy and paste business goals to double as the project objectives

Many high maturity organizations are not exhibiting superior performance and results

The Target Audience



Organizations appraised at or pursuing CMMI-DEV v1.2 Maturity Level 4 or 5

Individuals certified or pursuing certification as a CMMI High Maturity Lead Appraiser (HMLA)

Individuals authorized or pursuing authorization as an Instructor for the SEI CMMI-DEV v1.2 Introduction or Intermediate classes

CMMI High Maturity Use of "Business Goals" and "Project Objectives“ - 1

organization's business objectives

Senior management developed strategies designed to ensure an organization’s continued existence and enhance its profitability, market share, and other factors influencing the organization’s success. (See also “quality and process-performance objectives” and “quantitative objective.”)

(Taken from the glossary of the CMMI v 1.2)

CMMI High Maturity Use of "Business Goals" and "Project Objectives“ - 2

quality and process-performance objectives

Objectives and requirements for product quality, service quality, and process performance. Process-performance objectives include quality; however, to emphasize the importance of quality in the CMMI Product Suite, the phrase quality and process-performance objectives is used rather than just process-performance objectives.

(Taken from the glossary of the CMMI v 1.2)

CMMI High Maturity Use of "Business Goals" and "Project Objectives“ - 3

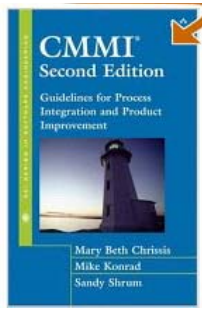
quantitative objective

Desired target value expressed as quantitative measures. (See also “process improvement objectives” and “quality and process-performance objectives.”)

(Taken from the glossary of the CMMI v 1.2)

OPP SG 1 Establish Performance Baselines and Models

Baselines and models, which characterize the expected process ***performance*** of the organization's set of standard processes, are established and maintained.



The following 16 slides are taken from a separate SEI presentation on CMMI High Maturity and used to illustrate how often the topic of Business Goals and Project Objectives comes up.

We have bold italicized these occurrences.

Excerpt from “If You’re Living the “High Life”, You’re Living the Informative Material” presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

OPP SP 1.1 Select Processes

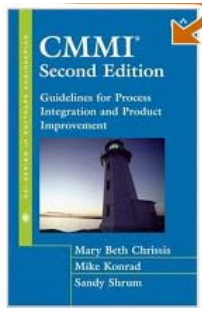
Select the processes or subprocesses in the organization's set of standard processes that are to be included in the organization's ***process-performance*** analyses.

Select processes/subprocesses that will help us understand our ability to meet the ***objectives*** of the organization and projects, and the need to understand ***quality and process performance***. These subprocesses will typically be the major contributors and/or their measures will be the leading indicators.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

OPP SP 1.2 Establish Process-Performance Measures

Establish and maintain definitions of the measures that are to be included in the organization's ***process-performance*** analyses.

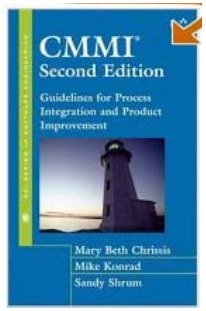


Select measures, analyses, and procedures that provide insight into the organization's ability to meet its ***objectives*** and into the organization's ***quality and process performance***. Create/update clear unambiguous operational definitions for the selected measures. Revise and update the set of measures, analyses, and procedures as warranted. In usage, be sensitive to measurement error. The set of measures may provide coverage of the entire lifecycle and be controllable.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

OPP SP 1.3 Establish Quality and Process-Performance Objectives

Establish and maintain quantitative ***objectives*** for ***quality and process performance*** for the organization.

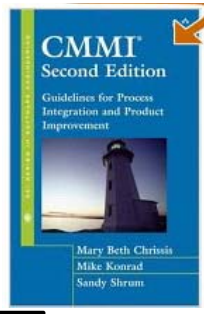


These ***objectives*** will be derived from the organization's business ***objectives*** and will typically be specific to the organization, group, or function. These ***objectives*** will take into account what is realistically achievable based upon a quantitative understanding (knowledge of variation) of the organization's historic quality and process performance. Typically they will be SMART and revised as needed.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

OPP SP 1.4 Establish Process-Performance Baselines

Establish and maintain the organization's ***process-performance*** baselines.

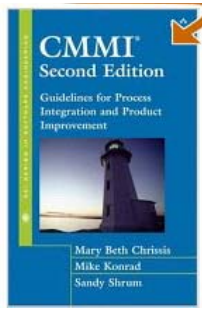


Baselines will be established by analyzing the distribution of the data to establish the central tendency and dispersion that characterize the expected performance and variation for the selected process/subprocess. These baselines may be established for single processes, for a sequence of processes, etc. When baselines are created based on data from unstable processes, it should be clearly documented so the consumers of the data will have insight into the risk of using the baseline. Tailoring may affect comparability between baselines.

Excerpt from “If You’re Living the “High Life”, You’re Living the Informative Material” presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 1.1 Establish the Project's Objectives

Establish and maintain the project's quality and ***process-performance objectives***.



These ***objectives*** will be based on the organization's quality and process performance ***objectives*** and any additional customer and relevant stakeholder ***needs and objectives***. These ***objectives*** will be realistic (based upon analysis of historical quality and process performance) and will cover interim, supplier, and end-state ***objectives***. Conflicts between ***objectives*** (i.e., trade-offs between cost, quality, and time-to-market) will be resolved with relevant stakeholders. Typically they will be SMART, traceable to their source, and revised as needed.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 1.2 Compose the Defined Process

Select the subprocesses that compose the project's defined process based on historical stability and capability data.

The PDP is composed by:

- selecting subprocesses
- adjusting/trading-off the level and depth of intensity of application of the subprocess(es) and/or resources

to best meet the quality and process performance ***objectives***. This can be accomplished by modeling/simulating the candidate PDP(s) to predict if they will achieve the ***objectives***, and the confidence level of (or risk of not) achieving the ***objective***.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 1.3 Select the Subprocesses that Will Be Statistically Managed

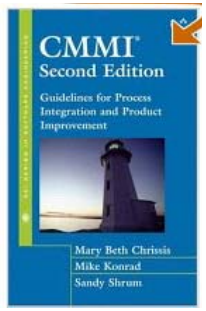
Select the subprocesses of the project's defined process that will be statistically managed.

Subprocesses that are the major contributors to or predictors of the accomplishment of the project's interim or end-state ***objectives*** will be selected. Additionally, these need to be suitable for statistical management. Statistically managing the selected subprocesses provides valuable insight into ***performance*** by helping the project identify when corrective action is needed to achieve its ***objectives***. Select the attributes that will measured and controlled.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 1.4 Manage Project Performance

Monitor the project to determine whether the project's ***objectives*** for quality and process ***performance*** will be satisfied, and identify corrective action as appropriate.



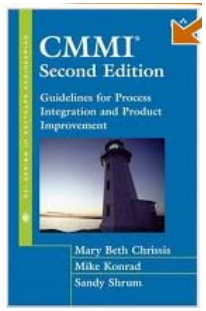
Monitor the project

- Manage stability and capability of selected subprocesses.
- Track quality and process performance data including suppliers'
- Update/calibrate PPMs and predictions based on results to date.
- Identify deficiencies/risks to achieving objectives (e.g., where current performance is outside tolerance intervals, or prediction/confidence intervals are not contained within specification limits).

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SG 1 Quantitatively Manage the Project

The project is quantitatively managed using quality and process-***performance*** objectives.



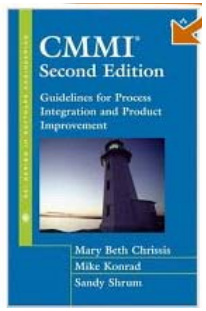
Projects are managed through the use of:

- measuring and controlling quality and process performance attributes.
- statistical techniques to ensure stable and capable subprocesses
- PPMs to predict if ***objectives*** will be met based on current performance
- spec limits to indicate when the performance of current processes will adversely affect the project's ability to meet its ***objectives***

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SG 2 Statistically Manage Subprocess Performance

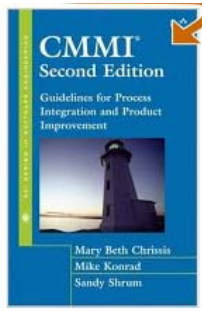
The ***performance*** of selected subprocesses within the project's defined process is statistically managed.



Excerpt from “If You’re Living the “High Life”, You’re Living the Informative Material” presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 2.1 Select Measures and Analytic Techniques

Select the measures and analytic techniques to be used in statistically managing the selected subprocesses.



Identify the measures that will provide insight into the ***performance*** of the subprocesses selected for statistical management and the statistical techniques that will be used for analysis. These measures can be for both controllable and uncontrollable factors. Operational definitions will be created/updated for these measures. Where appropriate (i.e., they are critical to meeting downstream ***objectives***), spec limits will be established for the measures.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 2.2 Apply Statistical Methods to Understand Variation

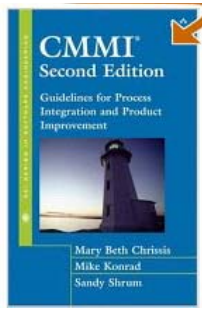
Establish and maintain an understanding of the variation of the selected subprocesses using the selected measures and analytic techniques.

Selected measures for the subprocesses will be statistically controlled to identify, remove, and prevent reoccurrence of special causes of variation, or in other words, stabilize the process. When control limits are too wide, sources of variation are easily masked and further investigation is warranted.

Excerpt from “If You’re Living the “High Life”, You’re Living the Informative Material” presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 2.3 Monitor Performance of the Selected Subprocesses

Monitor the ***performance*** of the selected subprocesses to determine their capability to satisfy their quality and process-performance ***objectives***, and identify corrective action as necessary.



For a stable subprocess, determine if the control limits (natural bounds) are within the ***specification limits*** which indicates a capable subprocess. If it is not, document corrective actions that address the capability deficiencies.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SP 2.4 Record Statistical Management Data

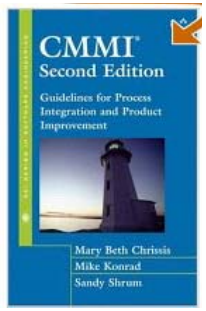
Record statistical and quality management data in the organization's measurement repository.

Record the data along with sufficient information to understand the context for the data and thus make the data usable by the organization and other projects.

Excerpt from "If You're Living the "High Life", You're Living the Informative Material" presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

QPM SG 2 Statistically Manage Subprocess Performance

The ***performance*** of selected subprocesses within the project's defined process is statistically managed.



Selected subprocesses are statistically managed to ensure stability and capability (i.e., special causes of variation are identified, removed, and prevented from recurring and the control limits of the subprocess are kept within the ***specification limits***).

Excerpt from “If You’re Living the “High Life”, You’re Living the Informative Material” presented at CMMI LA Workshop in St Louis, October, 2007, by Young, Konrad and Stoddard

Critical Role of Senior Organizational and Project Leaders

Senior leaders within the organization have unique perspective on business goals and stakeholder needs

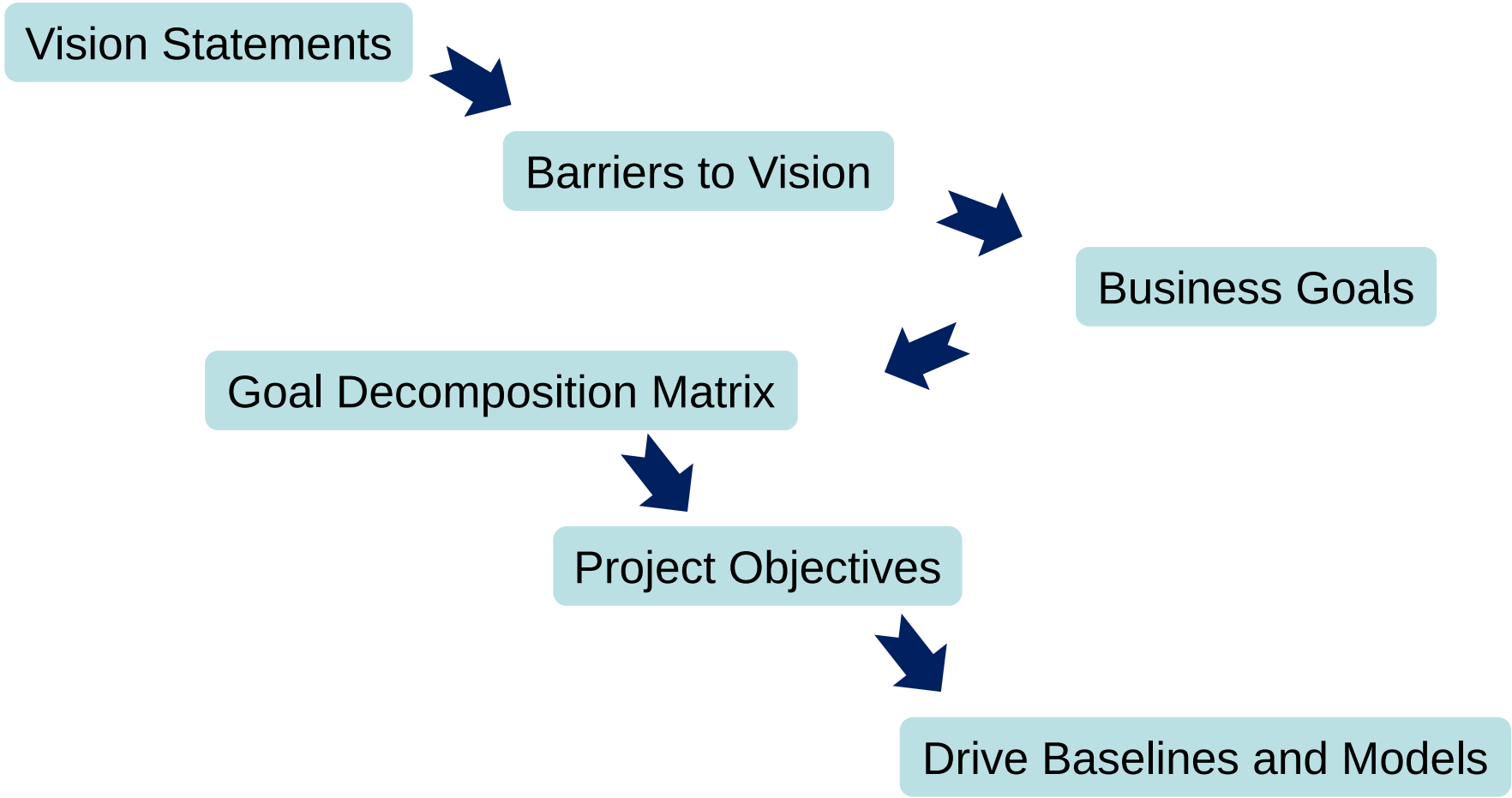
This perspective is vital to establishing the hierarchy of goals and objectives the organization should pursue

Many organizations have fallen in the trap of delegating the identification of business goals and project objectives to lower level individuals who do not have the necessary perspective

Without key senior leaders' involvement, the drive to CMMI High Maturity will be misaligned and focused on the wrong activities

Senior leaders must lead by example, behavior, and reward and recognition, thereby energizing the organization

The Overall Process to Reach the Goals and Objectives



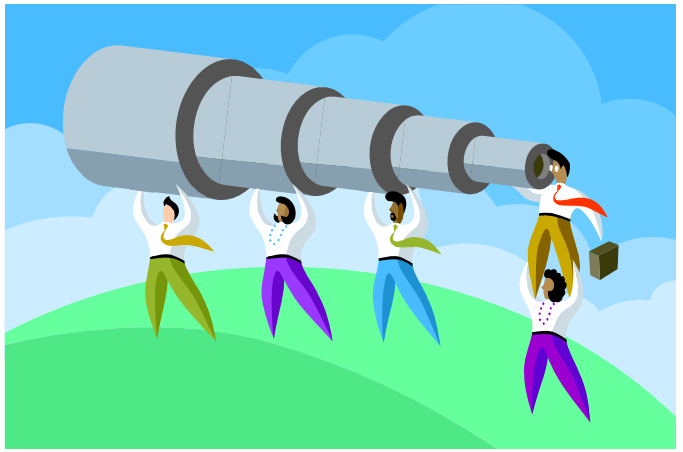
Step 1: Developing Vision Statements

Where do you want to see the organization in 3-5 years?

If you were retiring in the next 3-5 years, what legacy would you like to leave?

How do you want your organization to compare to peer and competitor organizations in 3-5 years?

How do you want your customers to view your organization in 3-5 years?



Example Vision Statement Templates

By < some date > , our organization will have achieved < a value > of < some attribute > with < a percentage > of confidence.

By < some date > , < a percentage > of < something > in our organization will have achieved < some status > with < a percentage > of confidence.

Example Vision Statements

By 12/31/2011, our organization will have achieved 40% of global marketshare with at least 90% confidence.

By 12/31/2011, 90% of projects across all divisions in our organization will have achieved operating within an appraised CMMI maturity level 5 division setting with at least 95% confidence.

Any Questions on Vision Statements?

Step 2: Identifying Barriers to the Vision Statements

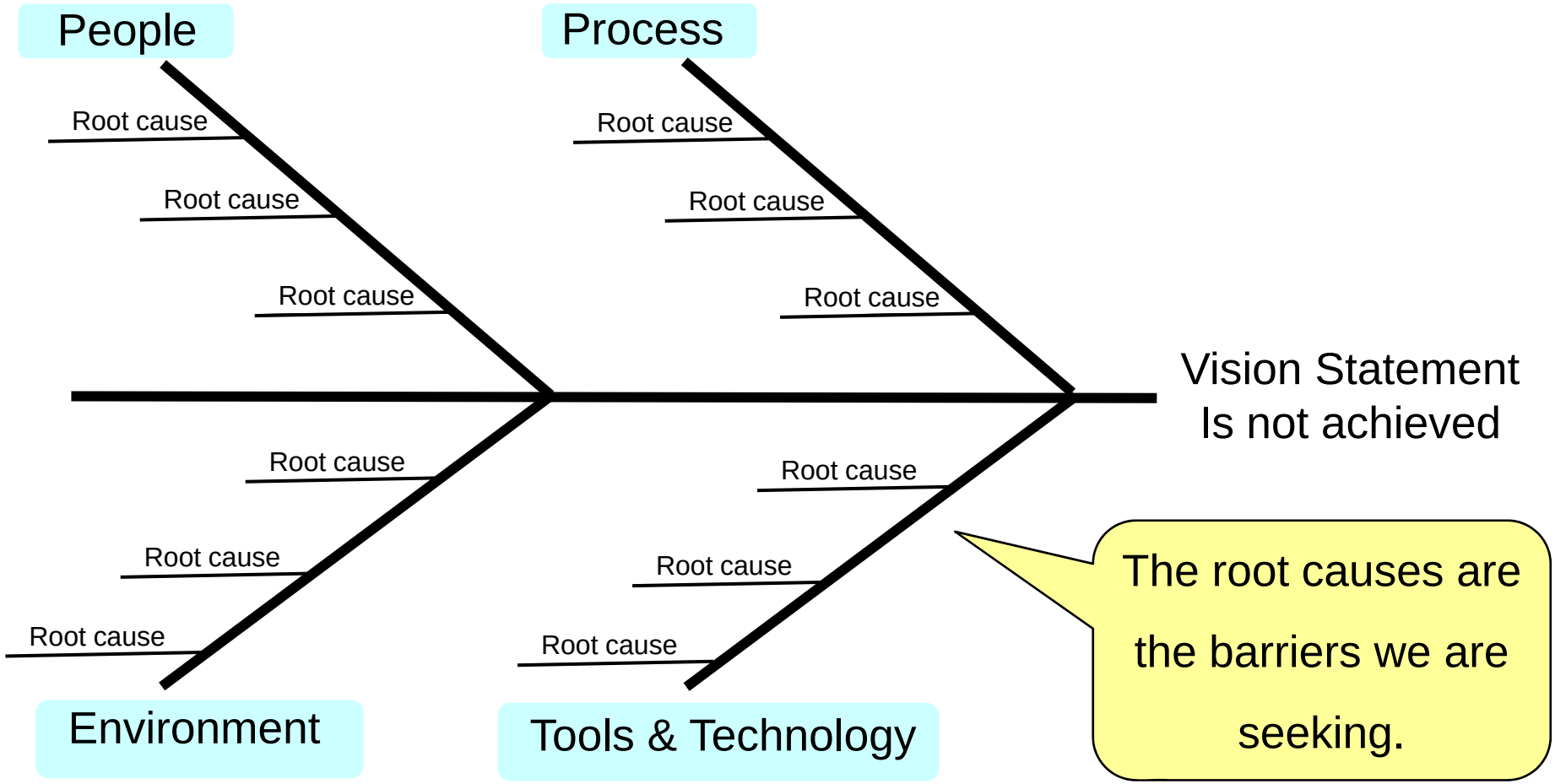
What are the barriers to each of the vision statements?

How might your organization stumble in pursuing the vision statements?

What are the key internal and external threats to achieving the vision statements?

What are the key environmental, people, process, technology, or tool issues that could impede progress towards the vision statements?

Using Ishikawa (Fishbone) Diagrams to Identify Barriers



Using Traditional SWOT to Identify Barriers and Opportunities

SWOT Matrix	Strengths	Weaknesses
Opportunities	Capitalize Here!	
Threats		Defend!

Step 3: Formulating Business Goals

What are the key ways that the barriers could be defeated?

What are the key ways that opportunities may be capitalized?

How can the organizational strengths be applied to reduce the barriers?

How can the organizational weaknesses be minimized towards reducing or eliminating barriers?

What are the S M A R T criteria to develop a credible goal statement?

How do we modify the traditional goal statement to include a notion that we do not want to sub-optimize by sacrificing other measures?

Do these business goals cover the stakeholder space of your organization?

Example Business Goal Statement Template

By < some date > , our organization will improve < some attribute > from today's performance baseline of < some distribution > to a new performance baseline of < some distribution > with < some percentage > of confidence without sacrificing < some attribute >.

Example Business Goal Statement

By 12/31/2011, our organization will improve time to market from today's performance baseline (a normal distribution with mean=215 days and standard deviation=13 days), to a new performance baseline (a normal distribution with mean=185 days and standard deviation=7 days), with 95% confidence and without sacrificing delivered quality (no more than 0.1 delivered defects per KSLOC).

This business goal is addressing Time to Market which was deemed a barrier to the Vision Statement related to Market Share

Caution Point!

It is normal that two types of Business Goal statements will be developed:

1. Business goals which can be satisfied based on the performance of projects within the organization
2. Business goals which must be addressed at the organizational level because they don't really relate to the execution of projects

When this happens, take two courses of action:

1. Develop a pipeline of organizational improvement teams to address the organizational improvements (consider DMAIC)
2. For goals related to project execution, continue following the process in this webinar

Any Questions on Formulation of Business Goal Statements?

Step 4: Introducing the Goal Decomposition Matrix

What are the key business and organizational goals?

What are the key processes and subprocesses in the organization?

What are the top 2-3 processes and subprocesses that most contribute to each goal?

Which of these processes and subprocesses should have a S M A R T project objective statement?

Which of these also should be statistically managed?

Process Step	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7
Req'ts Elicitation	X			X			
Prototype		X					
Architecture Modification						X	
High level Design			X				
Low level Design			X				
Coding							X
Unit Test							
Integration Test						X	
System Test	X			X			
Alpha Test							
Beta Test		X					

Goal Decomposition Matrix - 1

Process Step	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7
Req'ts Elicitation	X			X			
Prototype		X					
Architecture Modification							
High level Design			X				
Low level Design			X				
Coding							X
Unit Test							
Integration Test						X	
System Test	X			X			
Alpha Test							
Beta Test		X					

The ***first pass*** of this matrix is to identify the column headings, e.g. the Business or Organizational Goals

Goal Decomposition Matrix - 2

Process Step	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7
Req'ts Elicitation							
Prototype							
Architecture Modification						X	
High level Design							
Low level Design							
Coding							X
Unit Test							
Integration Test						X	
System Test	X			X			
Alpha Test							
Beta Test		X					

The ***second pass*** of this matrix is to identify the list of key processes, sub-processes or activities performed within the projects. Ideally, this list should not be longer than 20-40 items.

Goal Decomposition Matrix - 3

Process Step	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7
Req'ts Elicitation	X						
Prototype		X					
Architecture Modification							
High level Design			X				
Low level Design			X				
Coding							
Unit Test							
Integration Test							
System Test	X						
Alpha Test							
Beta Test		X					

The ***third pass*** of this matrix is to go column by column and ask yourself "*What are the top 2-3 processes, sub-processes or activities that most contribute to meeting the Business Goal*". These cells get marked with an "x".

Goal Decomposition Matrix - 4

Process Step	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7
Req'ts Elicitation	**1**						
Prototype		**X**					
Architecture Modification							
High level Design			**3**				
Low level Design			**X**				
Coding							
Unit Test							
Integration Test							
System Test	**X**						
Alpha Test							
Beta Test		**2**					

The ***fourth pass*** of this matrix is to identify the critical subset of the "x's" important enough to warrant developing a project level objective statement. These "x's" then become numbers corresponding to a numbered list of project objective statements.

Goal Decomposition Matrix - 5

Process Step	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7
Req'ts Elicitation	**1***						
Prototype		**X**					
Architecture Modification							
High level Design							
Low level Design							
Coding							
Unit Test							
Integration Test							
System Test	**X**						
Alpha Test							
Beta Test		**2***					

The ***fifth pass*** of this matrix is to identify the subset of the numbered project objective statements that possess sufficient uncertainty or variation to warrant statistical management. These numbered cells receive an "*" to indicate the use of an SPC chart, confidence/prediction interval or process performance model for statistical management.

Any Questions on the Goal-Decomposition Matrix?

Formulating Project Objectives

The S M A R T project objective statements should be worded as follows:

< Some measurable aspect > of < a process or subprocess > shall be controlled (*or improved*) to perform within < a specified range > of performance with < a specified amount > of confidence without causing suboptimization of < other processes or subprocesses >.

< Some measurable aspect > of < a process or subprocess > shall be statistically controlled (*or improved*) to perform within < a specified set of control limits > of performance and with < a specified level > of process capability with respect to < a set of specification limits > without causing suboptimization of < other processes or subprocesses >.

These project objectives must be in terms of the processes used in the project and thus, are necessarily much more detailed than business goal statements.

Any Questions regarding Project Objective statements?

Step 5: Goals and Objectives Drive Process Performance Baselines and Models

All "x" factors and "y" outcomes should have measurable performance baselines

Critical "x" factors that help predict performance outcomes "y's" should be considered for statistical management

Statistical management is more compelling when applied on "x's" rather than "y's"

Which of the business goals and project objectives should be predicted with process performance models?

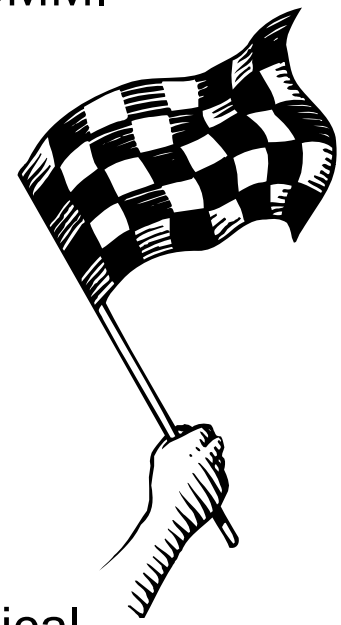
Should any of the "x" factors be predicted with a separate process performance model?

Any Questions regarding the Impetus for Process Performance Models?

Conclusion

Business Goals and Project Objectives have very specific meanings within CMMI High Maturity

These goals and objectives often exceed the content rigor of CMMI Low Maturity organizations in several ways:



1. They use the S.M.A.R.T. criteria
2. They discuss “before” and “after” baselines
3. Baselines are represented as distributions
4. They proactively anticipate sub-optimization
5. They establish confidence levels when appropriate
6. They directly and overtly tie project objectives to critical processes and sub-processes

Goals of this nature are the foundation of the CMMI High Maturity PA's

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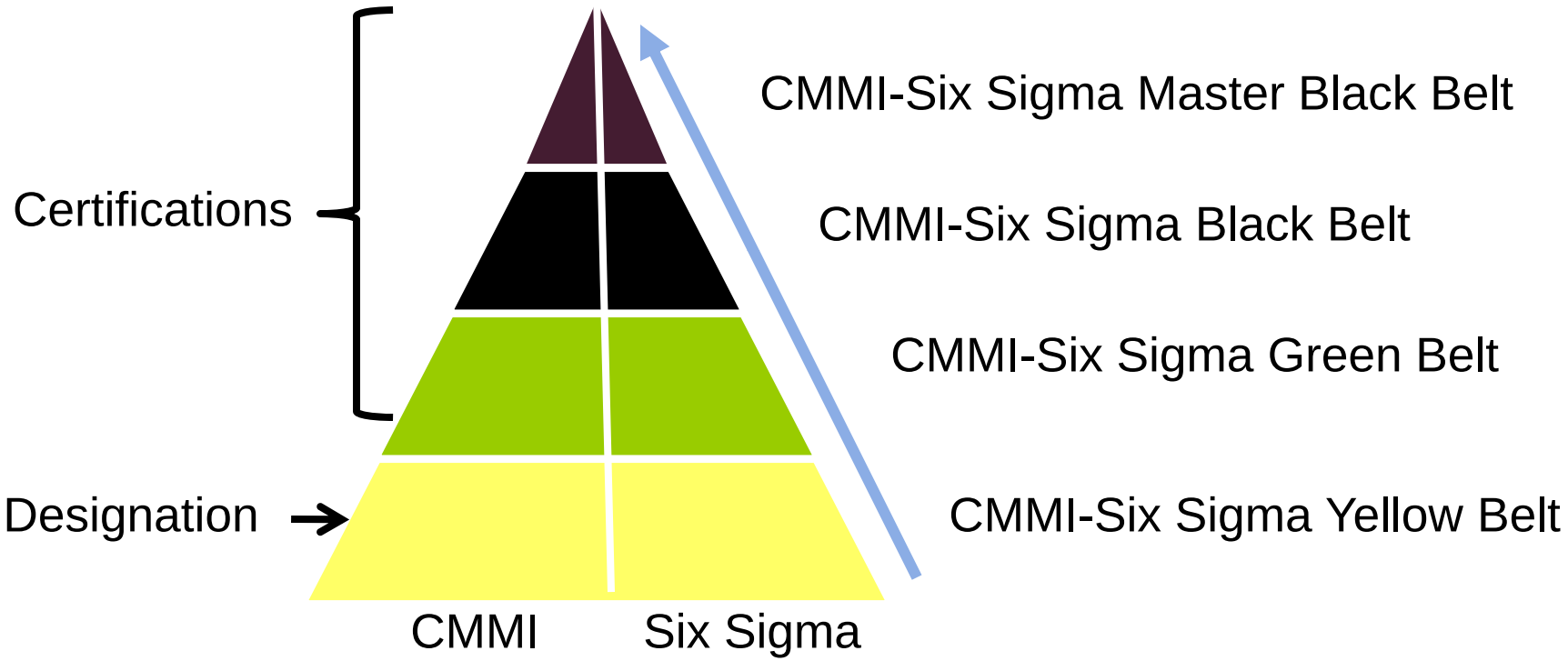

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